

Appl. No. 10/603,685
Amendment filed March 15, 2005
Reply to Office Action of September 17, 2004

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REMARKS

Claim 1-6, 9 and 11 have been amended and claims 8, 10 and 12 have been cancelled. Accordingly, claims 1-7, 9, 11 and 13 are currently pending.

SPECIFICATION AND DRAWINGS

The specification was objected to since numeral 19 was used to designate both a cover and a screw on page 18. The specification has been amended on pages 18 and 40 to designate the cover with the reference 18-a.

The drawings have been requested to be amended in Figs. 9 and 28 to include the reference 18-a and in Fig. 19 to include the reference 29 referred to in line 16, on page 27 of the specification. It is requested that these amendments be approved.

CLAIM OBJECTIONS

Claims 1 and 2 were objected to for the minor informalities set forth in numbered paragraphs 2 and 3, on page 2 of the Office Action. These claims have been amended to overcome these rejections.

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CLAIM REJECTIONS 35 U.S.C. §103

Claims 1-4 and 9-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Igarisha et al. U.S. Patent 5,186,044 in view of Yamada JP 09-038989A for the reasons set forth in numbered paragraph 5, on pages 2-4 of the Office Action.

Claims 5-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Igarashi et al. U.S. Patent 5,186,044 in view of Kondo et al. U.S. Patent 5,756,893 as set forth in numbered 6, on page 5 of the Office Action.

Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Igarashi et al. '044 patent in view of the Kondo et al. '893 patent and further in view of Yamada JP 09-038989A.

For the reasons set forth hereafter, it is submitted that claims 1-7, 9, 11 and 13, as amended, are patentable.

Patentability of the Claims

The present invention is directed to a thermal type flow measuring instrument comprising a sensing element for sensing an air flow, an electronic circuit electrically connected to the sensing element and a plastic frame casing component for

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accommodating and protecting the electronic circuit. The plastic casing component is a housing constructed from plastic as an injection molded part formed by integral molding together with a connector terminal which is extended from an inside to an outside of the plastic casing component while still penetrating through the casing component for electric connection of the electronic circuit to an external device. The housing further includes a fixing portion molded from plastic with a metal plate inserted therein for attachment to a duct component serving as a passage to which a fluid to be measured flows. The metal plate is entirely or partially covered with the plastic and the metal plate has an opening formed adjacent the corner of the metal plate in a plastic covered portion thereof at a part of the covered portion where a temperature stress is larger than a temperature stress at other portions of the metal plate. The opening is filled with plastic to thereby join the plastic on one surface of the metal plate with the plastic on an opposite surface of the metal plate.

The claims remaining in the application have been amended to more particularly claimed Applicants' invention as described above. It is believed that the claims, as amended,

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patentably distinguish over the combination of prior art cited and relied upon by the Examiner.

In covering the metal plate with plastic, the molten plastic is flowed along both the upper and lower surfaces of the metal plate and where the molten plastic on the upper surface meets the molten plastic from the bottom surface, a weld line is formed. The strength of the plastic covered product at the weld line is lower than that of other portions of the plastic resin on the metal plate. Therefore, it is desirable to shorten the length of the weld line of the plastic as much as possible. Applicants' invention permits shortening of the weld line.

Referring to Figs. 11A to 11E and 12 of the present application, when the opening is not formed at the corner portion of the metal plate, the plastic fluid covering an upper surface and plastic fluid covering a lower surface are joined at the vicinity of the corner portion to form a terminal and portion so that the length of the weld line 23 is long as shown in Figs. 11C and 11D.

On the other hand, referring to Figs. 18A to 18F and 19 of the present application, when the opening is formed at the corner portion of the metal plate, the plastic fluid covering

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an upper surface and plastic fluid covering lower surface are joined first through the opening formed at the vicinity of the corner portion so that the length of the weld line is shorter than that of the weld line shown in Figs. 11A to 11E. See for example, weld line 23 in Fig. 18C and weld lines 28 in Figs. 18D and E.

The present invention, by using shorter weld lines, retards the generation of cracks due to a temperature difference in environment, so that the reliability of the flow measuring instrument can be improved.

With respect to the prior art relied upon by the Examiner, Yamada teaches that a weld line generation portion is changed by means of a concave portion, which is not an opening, to improve the strength of the bracket. The opening 6 shown by Yamada is a screw hole. Yamada fails to disclose how to shorten the length of a weld line.

Further, according to Yamada, an extra protrusion is protruded from the instrument, so that the assembling ability of the instrument is lowered. On the other hand, according to the present invention, no extra protrusion is formed, so that the assembling ability of the instrument is not lowered.

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As recognized by the Examiner on page 3 of the Action, Igarashi does not show an opening or slot allowing the plastic to pass through the upper surface to the lower surface of the metal plate. Since both Igarashi and Yamada fail to show an opening in a metal plate as now claimed, the combination of these references does not render the claims, as now amended, unpatentable as being obvious.

The Kondo reference shows a subconnector terminal branched from a connector terminal. However, Kondo does not show an opening or slot allowing the plastic pass through the upper surface to the lower surface of the metal plate.

Further, the subconnector terminal according to Kondo is used for improving the electromagnetic waves influence resistance, by covering the sensor terminal to shield the sensor terminal.

As shown in Fig. 25 of the present application, the subconnector terminal of the present invention is arranged at the downstream side of the resin injection direction 21, being arranged to be perpendicular to the resin injection direction 21. Therefore, the construction of the subconnector terminal of the present invention is quite different from that of Kondo and claims 5-7 are not rendered obvious by the combination of

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Igarashi and Kondo. Neither is claim 8 rendered obvious by the combination of Igarashi, Kondo and Yamada. In any event, there is no suggestion in any of the three references of combining them with one or both of the other references in the manner done so by the Examiner.

Conclusion

In view of the foregoing amendments and remarks, Applicants contend that this application is in condition for allowance. Accordingly, reconsideration and reexamination are respectfully requested.

The Commissioner is hereby authorized to charge any fees that may be due in connection with this response to Deposit Account No. 50-1417.

Respectfully submitted,


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